

What is claimed is:

1. A method for operating a cardiac rhythm management device, comprising:
  - 5 detecting senses from multiple ventricular sites, where a sense corresponds to an intrinsic depolarization occurring at the site;
  - detecting a ventricular tachycardia when a time interval between successive senses detected from one of the sites meets a specified rate criterion;
  - 10 pacing one of the sites designated as the primary anti-tachycardia pacing (ATP) site with an anti-tachycardia pacing sequence in accordance with an ATP protocol when a ventricular tachycardia is detected, wherein the sequence is delivered at a selected coupling interval with respect to detection of a sense at the primary ATP site; and,
  - 15 pacing one or more of the other sites, designated as secondary ATP sites, at a selected ATP offset interval with respect to a pace delivered to the primary ATP site in the anti-tachycardia pacing sequence.
2. The method of claim 1 wherein the primary ATP site is selected as the site from which a sense is detected earliest during a single cycle of the ventricular tachycardia.
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3. The method of claim 1 wherein the ATP offset interval for a particular secondary ATP site is selected to be approximately equal to a measured time delay between a sense detected from the primary ATP site and a sense detected at the particular ATP site.
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4. The method of claim 1 wherein the ATP offset interval for a particular secondary ATP site is selected to be less than or equal to a minimum measured time delay between a sense detected from the primary ATP site and a sense detected at the particular ATP site.
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5        5.        The method of claim 1 further comprising reverting to a ventricular resynchronization pacing mode when the ventricular tachycardia is terminated, wherein in the resynchronization mode one of the sites is designated as the rate site and paced with a bradycardia pacing mode and one or more of the other sites are paced at specified resynchronization offset intervals with respect to paces delivered to the rate site.

10        6.        The method of claim 1 wherein a single site is located in each ventricle such that biventricular ATP therapy is delivered upon detection of a ventricular tachycardia with one of the ventricles designated as the primary ATP ventricle and the contralateral ventricle is designated as the secondary ATP ventricle, and further wherein an anti-tachycardia pacing sequence in accordance with a selected anti-tachycardia pacing (ATP) protocol is delivered to the primary ATP ventricle at a  
15        selected coupling interval with respect to detection of a sense in the primary ATP ventricle, and further wherein the secondary ATP ventricle is paced at a selected ATP offset interval with respect to the pace delivered to the primary ATP ventricle in the anti-tachycardia pacing sequence.

20        7.        The method of claim 6 further comprising reverting to a biventricular resynchronization pacing mode upon termination of the ventricular tachycardia.

25        8.        The method of claim 7 wherein the offset interval between paces to the ventricles gradually changes from the ATP offset interval to a programmed resynchronization offset interval upon termination of the ventricular tachycardia.

9.        The method of claim 6 wherein the primary ATP ventricle is selected as the ventricle from which the earliest sense is detected during a cycle of the ventricular tachycardia.

10. The method of claim 6 wherein the ATP offset interval is selected to be approximately equal to a measured time delay between a sense in the primary ATP ventricle and a sense in the secondary ATP ventricle during a cycle of the ventricular tachycardia.

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11. A cardiac rhythm management device, comprising:

sensing channels for detecting senses from multiple ventricular sites, where a sense corresponds to an intrinsic depolarization occurring at the site;

pacing channels for delivering paces to the multiple ventricular sites;

10 a controller for controlling the delivery of paces in accordance with a programmed pacing mode; and,

wherein the controller is programmed to detect a ventricular tachycardia when a time interval between successive senses at site meets a specified rate criterion;

15 pace one of the sites designated as the primary ATP site with an anti-tachycardia pacing sequence in accordance with an anti-tachycardia pacing protocol when a ventricular tachycardia is detected, wherein the sequence is delivered at a selected coupling interval with respect to detection of a sense at the primary ATP site; and,

20 pace one or more of the other sites, designated as secondary ATP sites, at a selected ATP offset interval with respect to a pace delivered to the primary ATP site in the anti-tachycardia pacing sequence.

12. The device of claim 11 wherein the controller is programmed to select the primary ATP site as the site from which a sense is detected earliest during a single  
25 cycle of the ventricular tachycardia.

13. The device of claim 11 wherein the controller is programmed to select the ATP offset interval for a particular secondary ATP site to be approximately equal to a measured time delay between a sense detected from the primary ATP site and a sense  
30 detected at the particular ATP site.

14. The device of claim 11 wherein the controller is programmed to select the ATP offset interval for a particular secondary ATP site to be less than or equal to a minimum measured time delay between a sense detected from the primary ATP site  
5 and a sense detected at the particular ATP site.

15. The device of claim 11 wherein the controller is further programmed to revert to a ventricular resynchronization pacing mode when the ventricular tachycardia is terminated, wherein in the resynchronization mode one of the sites is designated as the  
10 rate site and paced with a bradycardia pacing mode and one or more of the other sites are paced at specified resynchronization offset intervals with respect to paces delivered to the rate site.

16. The device of claim 11 wherein a single site is located in each ventricle such  
15 that biventricular ATP therapy is delivered upon detection of a ventricular tachycardia with one of the ventricles designated as the primary ATP ventricle and the contralateral ventricle is designated as the secondary ATP ventricle, and further wherein an anti-tachycardia pacing sequence in accordance with a selected anti-tachycardia pacing (ATP) protocol is delivered to the primary ATP ventricle at a  
20 selected coupling interval with respect to detection of a sense in the primary ATP ventricle, and further wherein the secondary ATP ventricle is paced at a selected ATP offset interval with respect to the pace delivered to the primary ATP ventricle in the anti-tachycardia pacing sequence.

25 17. The device of claim 16 wherein the controller is further programmed to revert to a biventricular resynchronization pacing mode upon termination of the ventricular tachycardia.

18. The device of claim 17 wherein the controller is programmed such that the offset interval between paces to the ventricles gradually changes from the ATP offset interval to a programmed resynchronization offset interval upon termination of the ventricular tachycardia.

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19. The device of claim 16 wherein the controller is programmed to select the primary ATP ventricle as the ventricle from which the earliest sense is detected during a cycle of the ventricular tachycardia.

10 20. The device of claim 16 wherein the controller is programmed to select the ATP offset interval to be approximately equal to a measured time delay between a sense in the primary ATP ventricle and a sense in the secondary ATP ventricle during a cycle of the ventricular tachycardia.

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